Classic sampling step by step

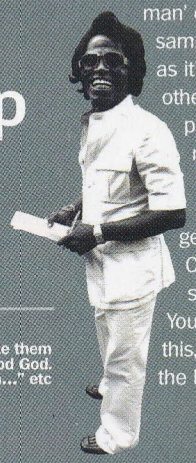
Getting your chosen sample into a workable medium, what to do with it once you've got it, and how to turn the whole lot into a tune...

There's no better way of learning than doing, so let's take a sample from a piece of music and see what we can do with it. While we can't give away unauthorised chunks of commercially released tracks on our cover CD due to those pesky copyright laws, there's not a lot 'the man' can do to stop you sampling what you like as long as it's for personal use. So in other words, when you're a private sampler, any old music will do.

The first part of our tutorial involves physically getting your music off vinyl or CD (provided by your good self) and into your computer. You'll need an audio editor for this, and as we're dealing with the basics, even the simplest piece of software will suffice. The second tutorial demonstrates various techniques for editing and tweaking your sample to get the most out of it. And finally, we'll show you three different ways of making loops out of our sample in a sequencer.

Due to the legal issue we've created our own sample for you to play around with: a freaky slice of hip-hop flava. Reason and Cubase SX are the programs used in our tutorial, but any sequencer and software sampler will be perfectly satisfactory.

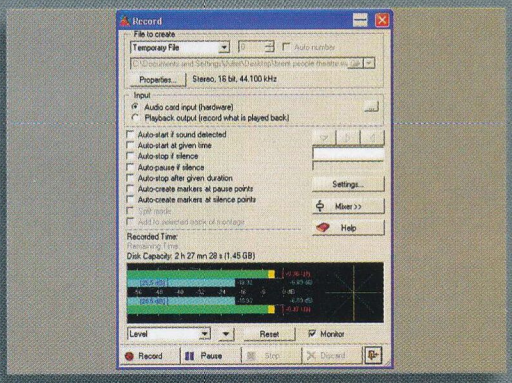
Do read *The law and You* on p38 before you begin, as **Computer Music** will not be held responsible for James Brown coming round your house and lamping you. Once you've done that, grab your records, break out the CDs, and dig up a jack lead: we're going to sample like it's 1989!



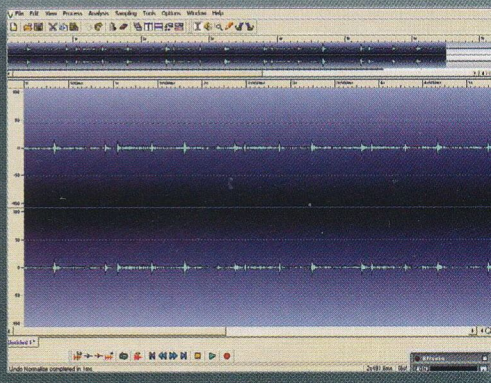
"Owww! Can I take them to the cleaners? Good God. Uhh! – I'm rich..." etc

STAGE ONE Recording a sample

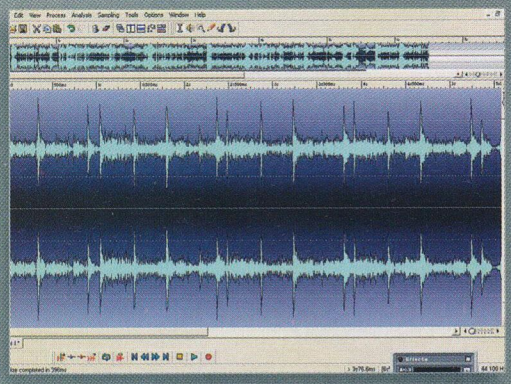
1 First off, you need to locate your source material. If the sample in question is from a CD, you should be able to import the required track right into your audio editor or sequencer. If you're recording from an external CD player or vinyl, you'll have to plug your stereo's output into your computer's Audio In. »



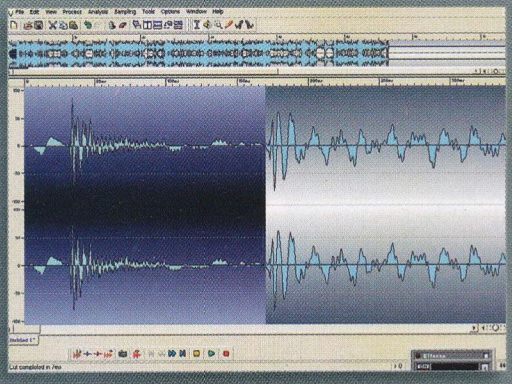
2 If your audio editor or sequencer has an Import From CD option, use it and rejoin us at step 5. Otherwise, play a little of the record or CD and make sure your editor's input level is healthy but not clipping. If you're not getting any input, check your computer's audio input source and level. »



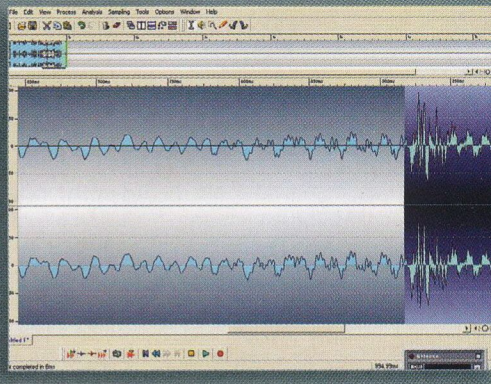
3 Once your volume level is OK, take a long recording of your sample, recording a few extra seconds at the start and end of your chosen section. This should ensure that you don't have to record the sample again because an important part has been lopped off. »



4 If your sample is a little on the quiet side and your audio input level is set to full, use your audio editor's **Normalise** function to boost the sample to maximum volume level. Otherwise, re-record the sample with a higher input volume level – normalising a quiet sample also increases any extraneous noise, so it's ideally avoided. »

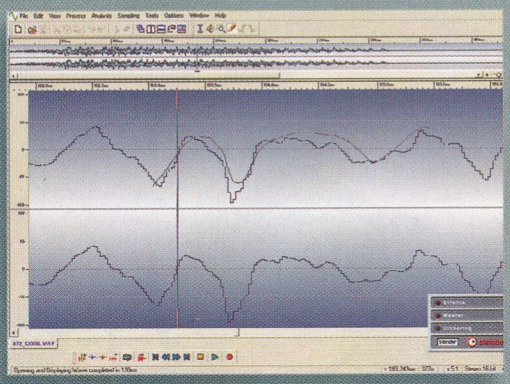


5 Find the part of the recorded wave file where your intended sample starts and snip off anything before this point, as illustrated. If you're intending to loop your sample, it's best to make sure it starts on the first beat of the bar. »



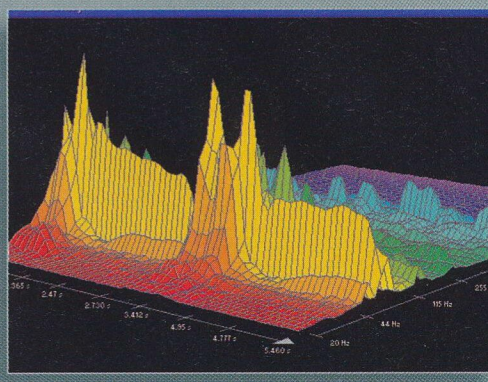
6 At the end of your intended sample (just before the first beat of the second bar if you're taking a one-bar loop), cut off anything you don't need. If your sample is a pitched sound that you intend to play up and down the keyboard, try and get as much of the instrument's tail to loop round as possible. Normalise and save.

STAGE 2 Preparing a sample for use

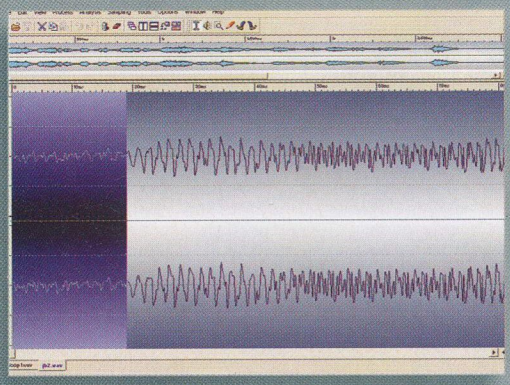


1 If your sample is taken off vinyl, you may experience typical quality problems such as unwanted clicks and low frequency noise. Clicks can be eliminated by finding the point on the wave where the click occurs – it will be a very high, short peak in the volume level. Now either re-draw the click, or snip it out of the wave. »

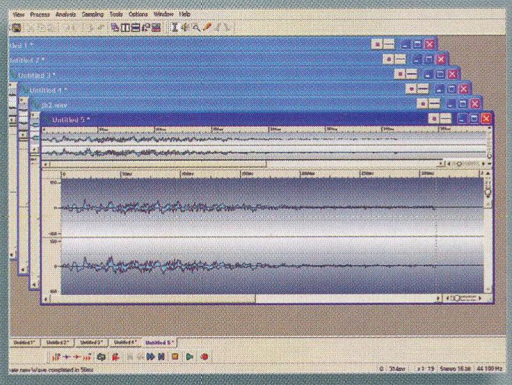
2 Unwanted low frequency noise from vinyl can be filtered out with a high-pass filter. A frequency of about 40Hz should do the job; anything higher may start to interfere with the sample's true low frequencies. Electrical hum is at 50Hz, so a tight notch filter right there should sort the problem out. »



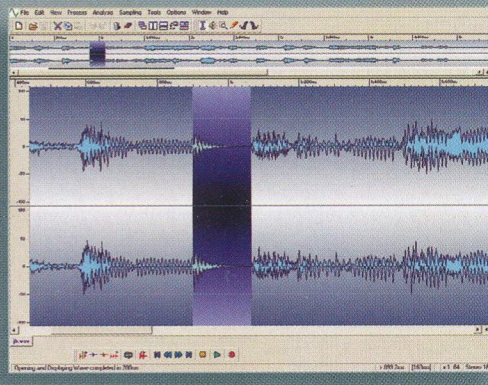
3 If your sampler has other particularly loud unwanted frequencies you'll probably want to deal with them with your sample editor's EQ or filter sections, but otherwise don't bother as you'll probably only end up re-EQing it later. »



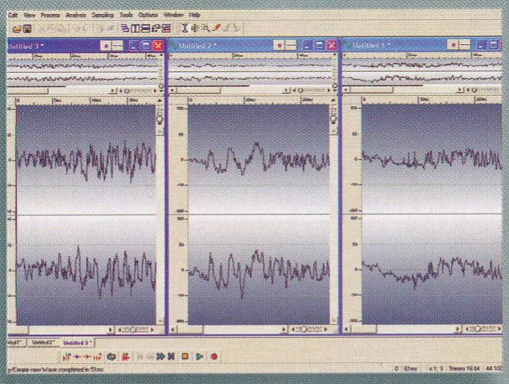
4 Other prep work on your sample depends on how you're going to use it. Most software samplers feature editable start and end points, largely negating the need to chop them up in the audio editor. If your sampler does not have this feature and your sample is a loop, beat or vocal, you'll probably want to slice it into sections. »



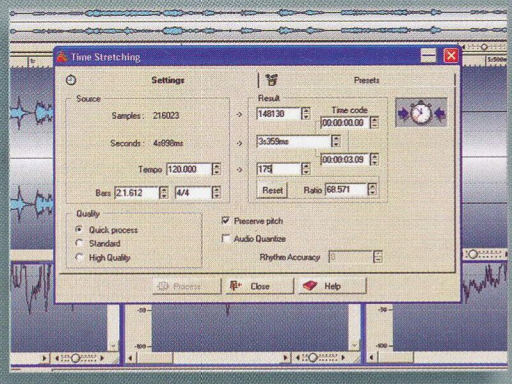
5 Rhythmical samples such as breaks and loops may not be played tightly enough to fit right into your track. Chopping them into sections and replaying them is an effective way of fitting them into a pre-existing tune. Breakbeats can be deconstructed by making each and every hit a separate sample. »



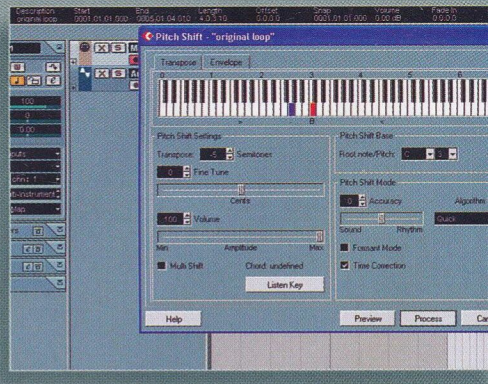
6 To keep the feel of a break, try chopping the loop int eighths or 16ths. Some sample editors will do this automatically with adjustable-sensitivity beat detection, but you can do it yourself with a little effort, and may get better results if the loop is particularly loose. »



7 With musical loops you can generally get away with less cutting up – making every eighth-note a separate sample should be enough for all but the loosest loops. If the track you're sampling from is sequenced or very tightly played, you certainly don't have to chop your samples up to this degree, but it does make for more flexibility later on. »



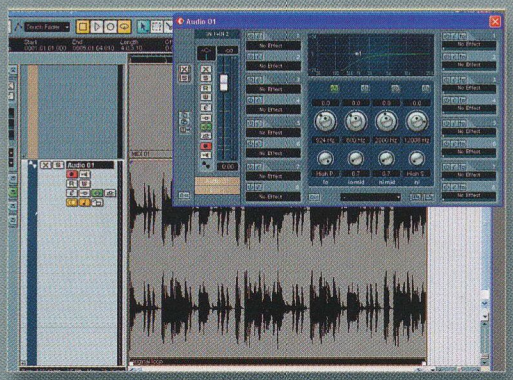
8 If your software sampler or audio sequencer doesn't have timestretching or pitchshifting abilities, you'll have to sort that stuff in your audio editor. Most editors will work out you sample's tempo, but if yours doesn't you can use **www.vocalist.org.uk/beats_per_minute_reference_chart.html** to work it out for yourself. Now you'll be able to timestretch it to your track's tempo in you audio editor. »



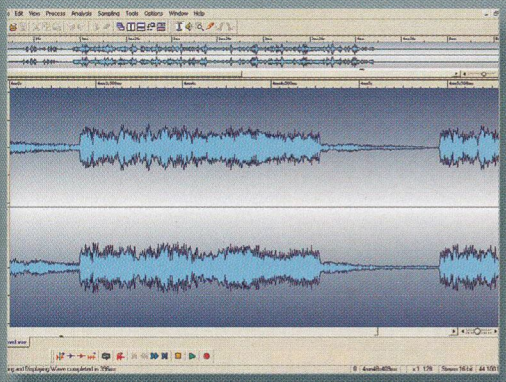
9 In order to pitchshift your vocals to the correct key you'll need to check out how they sound with the res of your sequence, so load the sample into your sequencer and see how many semitones it needs to be transposed by. If your sequencer won't do pitchshifting, loa you audio editor back up and do it in there.

STAGE 3 Isolating part of a sample

1 To remove a bassline from a loop, apply a high-pass filter. Around 100Hz will get rid of sub bass and the low part of kick drum. A low-pass filter set to the same value will give you just the bassline and kick drum parts of a loop. »

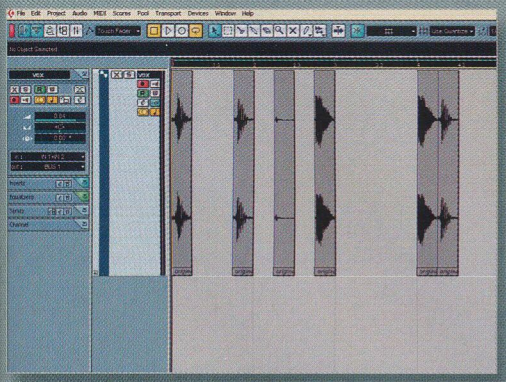


2 A high-pass filter can also help you isolate the high percussion parts of a loop – handy for when you want a percussive break but still want to keep the tension going. Generally, a frequency of around 1kHz will do it. »

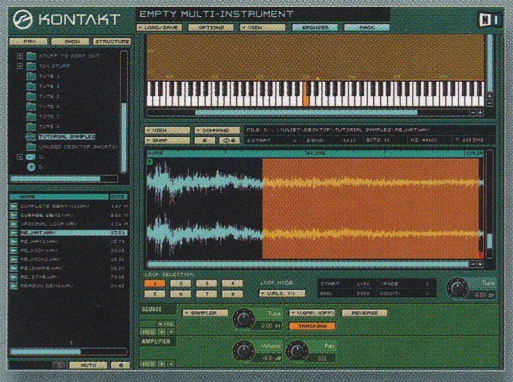


3 If there's something else going on in the background of your vocal sample, don't worry – try whacking it in the mix anyway. A lot of tracks have loads of extraneous stuff going on in the background – check out Layo & Bushwacka's *Love Story* and the sample source, Nina Simone's *Rags and Old Iron*. »

4 If your sample has unwanted high frequency sounds such as hi-hats, shakers or even good old-fashioned record noise, a subtle bit of low-pass filtering can often sort it out without altering the feel of the sample too drastically. If a LPF is too much, sweep a tight notch filter around to find and remove the unwanted frequency. »

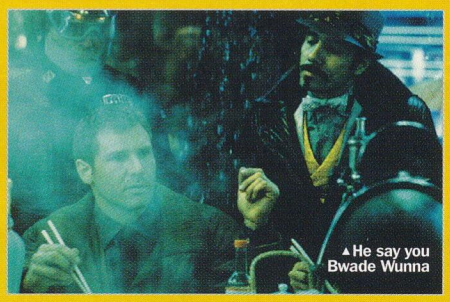


5 If you've pitchshifted a vocal to the right key for your tune, but the melody of it doesn't fit, try pitchshifting the offending notes to fit. If this is too much hassle, try cutting the vocals into bite-sized sections that you can arrange like a pitched percussion kit. It probably won't make much sense, but it may sound good. »



6 If your sample doesn't have enough 'tail' to it – so that, for example, the end of a cymbal crash is interrupted by a snare – loop the end of it (preferably with a back-and-forth setting) and stick it through a volume envelope with a long release time. This works well with most sustained sounds.

MOVIE DIALOGUE



▲He say you Bwade Wunna

PHOTOGRAPHY: Aquarius Collection

One of the most popular sources for samples is the movies, and no doubt you'll have heard many a tune that uses a portentous line of dialogue or two from your favourite blockbuster. The *Top Sample Lists* (**www.sloth.org/samples/**) is a website devoted entirely to documenting and charting the use of movie, television and other dialogue sources. There are thousands of entries, and although the site is by no means comprehensive, it does make for an interesting curio. Unsurprisingly, *Blade Runner* (sampled by Gary Numan among others) is the most sampled dialogue source so far, though George Bush Sr (The KLF) makes a shock appearance at number 10, with Dubbya (Johnny L) trailing at 114.

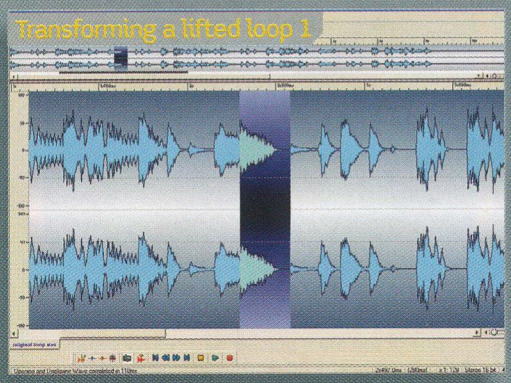
Other artists who have used film dialogue include Cypress Hill (a huge chunk of *Pulp Fiction* on their *Temples of Boom* LP), Orbital (sampling Worf from *Star Trek: The Next Generation* on their *Brown Album*), and DJ Zinc (his track *Star Wars* has to be heard to be believed). Probably the best remembered example of sampled movie dialogue is 2 Live Crew sampling *Full Metal Jacket* for *Me So Horny* – superb work, memorable hook, has been loved long time by many sampling aficionados.

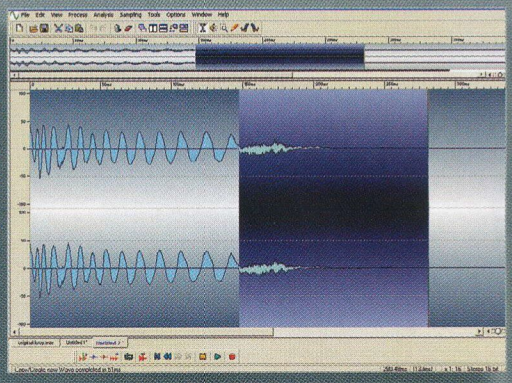
Getting decent quality samples from movies is easy these days thanks to DVD technology, and if you've got a DVD drive in your computer you can rip digitally with software like DVD Audio Extractor (**www.free-codecs.com/download/DVD_Audio_Extractor.htm**) or Audio Hijack (**www.rogueamoeba.com**). Bear in mind that clearing a sample from a movie or television is notoriously difficult, however, and if your track becomes successful, an uncleared sample can throw a spanner the size of the Hollywood sign in the works – see *The law and you* for more info on this subject.

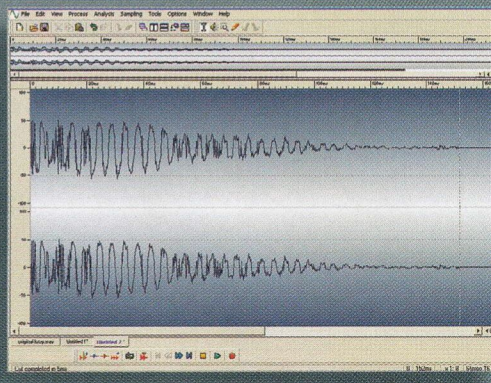
▲Physically getting movie samples is easy. Getting permission to use them isn't

STAGE 4 Transforming a lifted loop

Now that you've extracted your sample and prepared it for use, how are you going to mess around with it to make it yours? Here are three possibilities...







1 In order to reprogram the original beat with Reason's ReDrum sample player, we'll need to chop it up first in an audio editor. We're not going to do anything fancy, so any old editor will do. Load up **Original loop.wav** from the CD and locate the clearest kick drum (2.298 secs). »

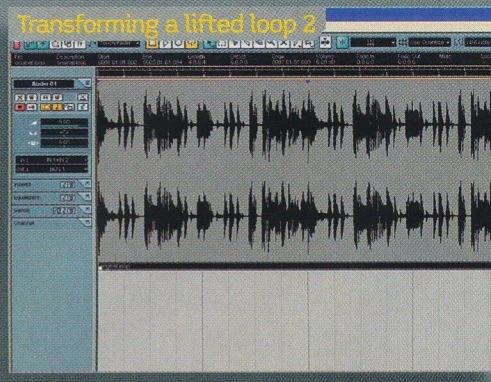
2 Copy the kick to a new window and cut off the hi-hat, as illustrated. You should now have a short but largely unfettered kick drum sample. Save it as **Re_kick.wav** and find the clean snare hit just before the three-second mark. Can you see where we're going with this? »

3 Copy the snare to a new sample and top and tail it s it looks like the one above. Save as **Re_snare.wav**. The other samples you'll need to find and save in a similar manner are **Re_hat** (2.14s), **Re_kick2** (3.25s), **Re_hat2** (2.86), and **Re_stab** (4.82), which you can edit to be as short or long as you like. »

4 Start Reason and begin a new project at 105bpm. Add a ReDrum sample player and load up the six samples we've just created. Select the Re-kick channel and place triggers on steps 1, 4, 9, 12 and 14. This will be the basic rhythm that we will build up to create a new drum track. »

5 Select the Re_snare channel and whack triggers on steps 11 and 13. It's still sounding a bit stilted so we need some Re_hat triggers on steps 3, 6, 8 and 15. Not too shabby, but a little more bounce can be added with some Re_hat2 action on steps 7 and 8 as illustrated. The final touch is a couple of Re_kick2 triggers on 13 and 16. »

6 We're going to add some Re_stab funkiness now, but we need to do a little knob tweaking first. On the Re_stab channel, switch the velocity envelope shape to square, and set the length attribute to between 50 and 70, according to taste. You can copy our arrangement illustrated, or try your own. »

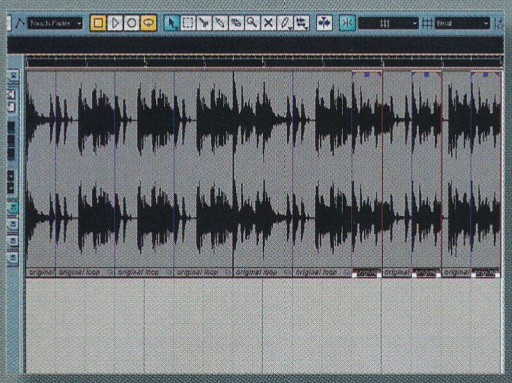


7 It wouldn't be a beat programming tutorial if we didn't have a bit of compression, so stick on a COMP-01 compressor with a high ratio and relatively low threshold, attack and release settings. This should give the beat a bit more bump. »

8 For the final sweeping touch, we need a filter, so stick an ECF-42 in there. Turn the envelope amount control down to **0**, and find a nice resonance level for the filter's **LP12** setting. Automate the cutoff to bring your track in and out in a style similar to Fatboy Slim's *Right Here, Right Now* – and indeed most house music made in the last decade. »

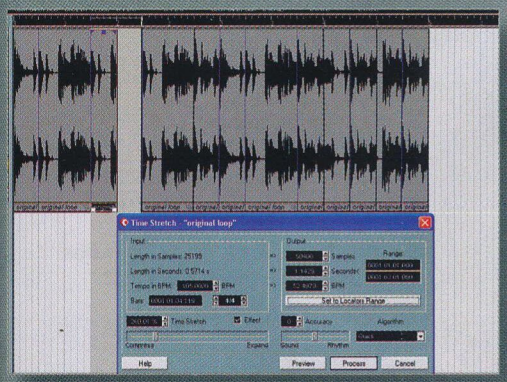
9 Now for our second transformation. Simply cutting up loops in your sequencer is probably the easiest way to begin messing with loops, and though it's generally not as flexible as using a sampler, it is a very good way of getting quick results. Load the **Original loop.wav** sample on the CD into your sequencer and set the tempo to 105bpm. »

10 Original loop.wav is based around a simple two-bar bass groove. We're going to mess about with it by extending it over more bars. Slice the sample at beats 2, 4 and 8. Delete the section between beats 4 and 8, then replace the empty gap with copies of the section between beats 2 and 4, as pictured. »

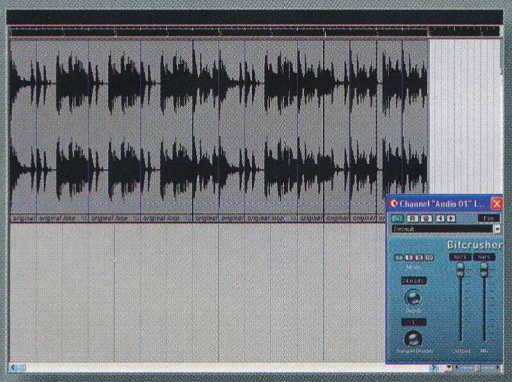


11 To funk up the second bar, delete the bits of the sample between beats 12 and 13, and beats 14 and 15. Copy and paste the last beat of the second bar a couple of times to fill the gaps and we've got ourselves a funky little riff. »

12 If you'd like to use this beat minus the bassline, you can simply apply a high-pass filter to it – a cutoff frequency of about 175Hz should do it. This will take some bottom end off the kick, so you might need to beef up the beat with a kick drum sample afterwards. »



13 The next little trick involves shortening the sample on beat 4 so that there's a gap between beats 5 and 6. Right-click the sample on beat 4 and choose **Process»Time Stretch**, set time-stretch to 200%, then **Process**. This will give you a nice time-stretched fill, though you may need to fade it. »

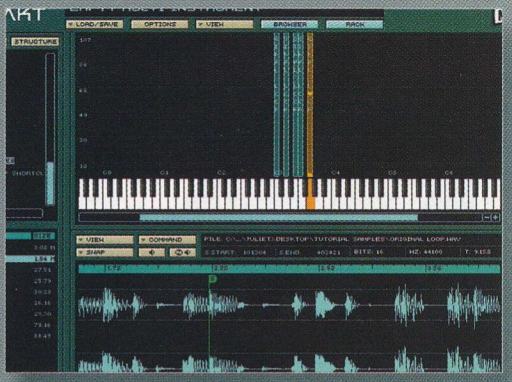


14 OK, that's fun, but redo it a couple of times to get rid of the time-stretched beat and take off any high-pass filtering you applied. Now add a BitCrusher insert on the beat's channel. Take the depth up to 24-bit and experiment with the Sample Divider knob. »

15 Turn your BitCrusher's Automation Write button on and record a bit of fiddling with the Sample Divider knob. As you'll be able to hear, this creates Space Cowboy – *I Would Die 4 U*-style degradation effects – great for bringing in or taking out a loop. »

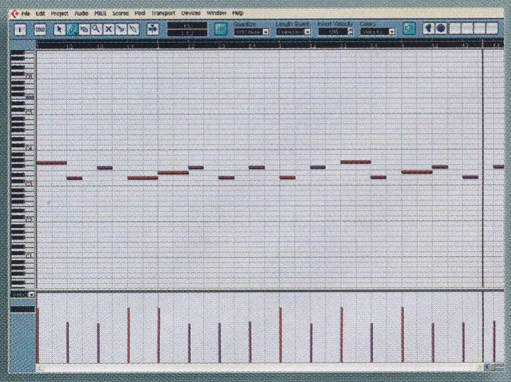
16 Turn the **Automation Write** button off and turn the **Automation Read** button on. Now create a smooth sweep that gradually reveals the loop to the listener, before cruelly taking it away again forever, as illustrated. Crunchier than burnt toast! »

17 Onto transformation number three, then. Load up your favourite sequencer and plug-in sampler combo; here we're going for Cubase SX and Kontakt, but any alternative will do. Create a patch on your software sampler with five keyzones all playing our **Original loop.wav** sample. »

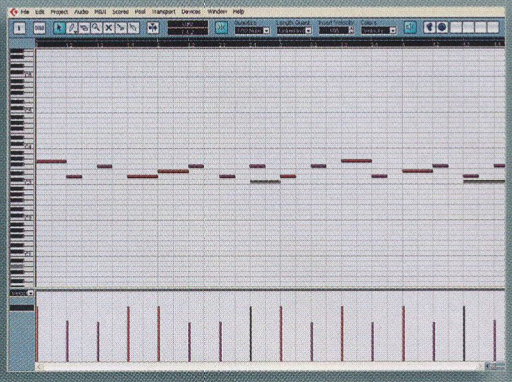


18 Leave the first keyzone playing from the start of the sample. The next three should be set at the three drum hits after the first kick, with the fifth keyzone set to the solo kick at approximately 101,000 samples in. »

STAGE 4 Transforming a lifted loop (continued)



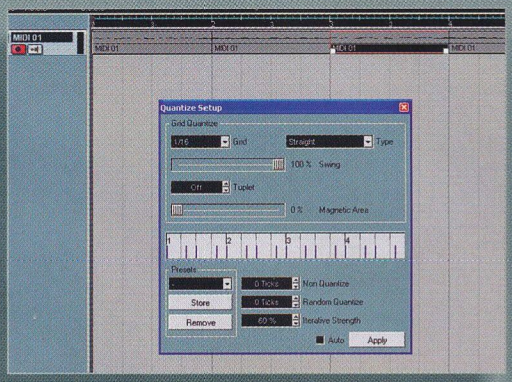
19 Now you're ready to program your own beat. Here we've used quarter-note length kick and snare hits, with quieter eighth-note length hits for everything else. Set your sequencer's tempo to 110bpm or thereabouts and program something similar. »



20 We've snuck a few stab hits in. You might need to turn the velocity of these down if you intend to put them on kick or snare hits. Keep their lengths short to avoid making the beat sound too busy. »

21 For a live feel, add some subtle reverb like this one, with a small room size, low reverb time and low wet level. Some compression would be good too, so add a dynamics unit with similar settings to those illustrated above. »

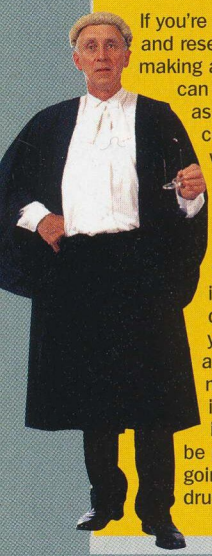
22 Duplicate a version of the bar you're working on, and edit the new one. Delete everything between beats 1 and 2. Now copy the first beat to the other beats of the bar so that it plays four times. Add stabs on the beat as illustrated, in a similar style to Fatman Scoop's *Be Faithful*. »



23 Go back to the Arrange window and duplicate the two bars of music you've got so far. Highlight bar 3 and head to the **MIDI»Quantise Setup** menu. Set the Grid Quantise value to 1/16th, Swing to 100%, and click **Apply**. This is a technique used on Andy C and Shimon's *Body Rock*. »

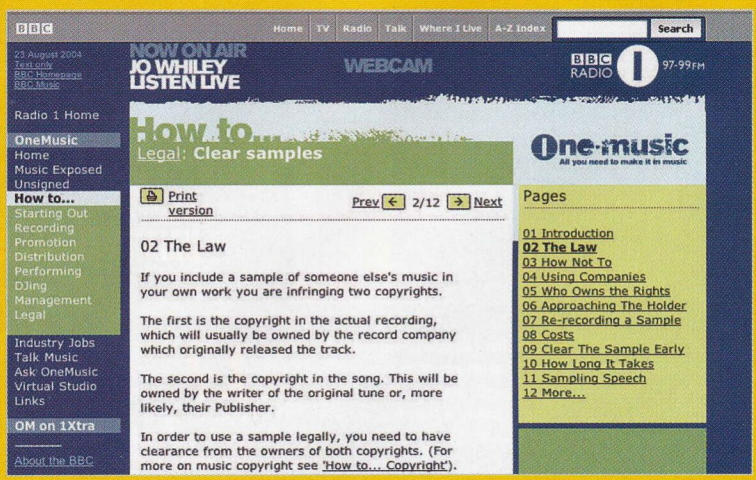
24 Export your funky new bars as audio, and load up the new sample in the Arrange window. This allows you to chop up and arrange the beat in a more convenient manner than MIDI might allow, plus you can now snip out separate sections and apply effects processing to them individually.

THE LAW AND YOU



If you're using samples for 'private and research study purposes' (eg, making a tune in your bedroom), you can sample whatever you like as it's not infringement of copyright. However, if your work is broadcast (eg, played on the radio), performed in public (eg, played in a club) or distributed (eg, via CD or the internet), you will have infringed copyright law. This doesn't necessarily mean you'll be taken to court, although if you start making money out of a copyright-infringing piece of work (and if there's a chance it could be proven in court – no one's going to sue you for a kick drum sample), you could well find yourself losing out financially. If you're merely pressing up a few hundred white labels or releasing tracks for free on the internet, it's likely no one will be too bothered. Note: this does not constitute any kind of guarantee!

The best way to avoid a costly court case is to clear your samples with the copyright owner. This can be done by contacting the publisher and record company of the original track. Send them a CD featuring your track and the original version of the tune you took the sample from. Include a sheet with the times that the samples occur in each track, along with as many details of the planned release as you can, including the label and the number of copies you're getting pressed. There's a useful guide to the whole issue here: **www.bbc.co.uk/radio1/onemusic/legal/samplep01.shtml**.



If you're sampling someone's music, make sure you stay on the right side of the law!